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EXAMINER	
LAO, LUN S	

ART UNIT	PAPER NUMBER
2615	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/551,273	SAITO ET AL.	
	Examiner	Art Unit	
	Lun-See Lao	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,8,9,11,13-17 and 20-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8,9,11,13-17 and 20-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This action is in response to the amendment filed on 02-13-2006. Claims 5-7, 10, 12, and 18-19 have been canceled. Claims 1-4, 8, 9, 11, 13-17, 20-29 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Andrea (US PAT. 6,061,456).

Consider claim 1, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a sound signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the microphone system comprising two microphones (11,21) having directional characteristics (because, omnidirectional microphone, non-directional microphone and directional microphone have directional characteristics), wherein the microphones are positioned relatively close to one another, and the angles (see fig.6) formed by the orientations of the microphones with respect to a sound signal direction are different for each of the microphones (see col.6 lines 13-28); and wherein a signal from the first

microphone (see fig.2, (11)) is supplied through a target response setter having a delay characteristic (14) to a subtracter (15); a signal from the second microphone (21) is supplied through an adaptive filter (24) to the subtracter (15); and the output of the subtracter (15) produces a difference signal that is supplied to the adaptive filter (24) which executes adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of the difference signal (see col.3 line 9-col. 4 line 31); while Sasaki teaches that one of two microphone is an omnidirectional microphone, the other is a unidirectional microphone.

Sasaki shows that the sound signals come from a camcorder instead of from a person (see col. 1, lines 8-16 and sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37). It would have been obvious that sound signals could have come from a person, because Sasaki does not limit sound signal that it comes from a camcorder only. Therefore, it would have been obvious to place the microphones in front of and above the position of the speaker's mouth by approximately the same distance as claimed based on designer preference on how to make the noise cancellation system more efficient.

Sasaki does not explicitly teach that the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0°, and that the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 45°.

Andrea teaches the angle formed by the orientation of one microphone (12, fig.3b) with respect to a speaker's vocalizing direction (speaker's mouth, when facing and talking to the telephone's receiver's surface 44) is approximately 0° (coincide with

the axis of microphone 12), and the orientation of another microphone (14) to form an angle of approximately 45° (45° lies between 30° and 60°, col.14 lines 7-12) with respect to the speaker's vocalizing direction, the microphones of Andrea. Further, Andrea teaches both microphones are positioned in front of and above the position of the speaker's mouth by approximately the same distance (for example, the receiver is in the form of a headset and a user speaks to the microphones, fig.9c and col.19 line 65-col.20 line 41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide an active noise cancellation apparatus and active noise reduction apparatus which reduce background noise to an acceptable level.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) as applied to claim 1 above, and further in view of Miwa (JP 08-040070).

Consider claim 2, Sasaki and Andrea fail to disclose a microphone is mounted on the sun visor of a vehicle.

However, Miwa teaches a microphone is mounted on the sun visor of a vehicle (see constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea, with Miwa to provide the microphone arranged close to the narrow side of the sun visor facing away from the speaker/listener at only a very small distance from the sun visor.

5. Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) as applied to claim 1 above, and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 3-4, Sasaki and Andrea fail to teach the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system, wherein the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg into the teaching of Sasaki and Andrea to provide the microphone apparatus having better directional sound.

6. Claims 8, 11-12, 21-22, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Andrea (US PAT. 6,061,456) and Miura (JP 61028294).

Consider claim 8, Sasaki teaches a microphone system that outputs a speaker's voice signal with an improved SN ratio, comprising two microphones having directional characteristics (see fig.3 and because, omnidirectional microphone, non-directional microphone and directional microphone have directional characteristics) , wherein the two microphones (11,21) are positioned substantially adjacently, and angles (see fig.6) formed by the orientations of the microphones with respect to a speaker's vocalizing direction are different for each of the microphones (see col.6 line

13-28); and wherein a signal from the first microphone (see fig.2, (11))) is supplied through a target response setter having a delay characteristic (14) to a subtracter (15); a signal from the second microphone (21) is supplied through an adaptive filter (24) to the subtracter (15); and the output of the subtracter (15) produces a difference signal that is supplied to the adaptive filter (24) which executes adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of the difference signal (see col.3 line 9-col. 4 line 31); while Sasaki teaches that one of two microphone is an omnidirectional microphone, the other is a unidirectional microphone.

Sasaki shows that the sound signals come from a camcorder instead of from a person (see col. 1, lines 8-16 and sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37). It would have been obvious that sound signals could have come from a person, because Sasaki does not limit sound signal that it comes from a camcorder only. Therefore, it would have been obvious to place the microphones in front of and above the position of the speaker's mouth by approximately the same distance as claimed based on designer preference on how to make the noise cancellation system more efficient.

Sasaki does not explicitly teach the two microphones are spaced apart approximately 9 cm, both microphones are positioned in front of and above the position of a speaker's mouth by approximately the same distance, and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0^0, and the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 60°.

However, Andrea teaches both microphones are positioned in front of and above the position of a speaker's mouth by approximately the same distance (such as, the user hands on a telephone set to speak to the microphones and see fig.3b,(12,14) and col.13 line 15-col.14 line 67); and the angle formed by the orientation of one microphone with respect to the speaker's vocalizing direction is set to approximately 0°, and the angle formed by the orientation of the other microphone with respect to the speaker's vocalizing direction is set to approximately 60° (note discussion of Andrea in the rejection of claim 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide an active noise cancellation apparatus and active noise reduction apparatus which reduce background noise to an acceptable level.

On the other hand, Miura teach the two microphone are space apart approximately 9cm (see figs1-2 and constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Miura to improve low frequency respond.

Consider claims 11-12, Sasaki teaches a microphone system further comprising a filter processing means that updates inherently (such as changing the tap) filter coefficients (weight vector) of the adaptive filter (see col.9 line 50-col.10 line 15); and the filter processing means receives a voice signal outputted from a microphone and a difference signal outputted from the calculation means, and updates inherently (such as changing the tap) the filter coefficients of the adaptive filter so as to minimize a power of the difference signal by using the LMS algorithm (see col.9 line 50-col.10 line 15).

Consider claim 21, Miura teaches a microphone system of the distance between the two microphones is about 9 cm (see figs.1-2 and constitution).

Consider claim 22, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two directional microphones (11,21) (see col.6 lines 13-28); and wherein a signal from the first microphone (see fig.2, (11))) is supplied through a target response setter having a delay characteristic (14) to a subtracter (15); a signal from the second microphone (21) is supplied through an adaptive filter (24) to the subtracter (15); and the output of the subtracter (15) produces a difference signal that is supplied to the adaptive filter (24) which executes adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of the difference signal (see col.3 line 9-col. 4 line 31); but Sasaki does not clearly teach both microphones are directional microphone. Sasaki indicates one of the two microphones are directional microphone (see col. 3 lines 10-15). Therefore, it would have been obvious that microphone apparatus system as taught by Sasaki could have replaced the omnidirectional microphone by a directional microphone with orientation of first and second microphone and the distance between the first and second microphone in the noise cancellation system so that the desired amount of background noise can be cancelled for the market demand.

Sasaki shows that the sound signals come from a camcorder instead of from a person (see col. 1, lines 8-16 and sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37). It would have been obvious that sound signals could have come from a person, because Sasaki does not limit sound signal that it comes from a camcorder only.

Therefore, it would have been obvious to place the microphones in front of and above the position of the speaker's mouth by approximately the same distance as claimed based on designer preference on how to make the noise cancellation system more efficient.

Sasaki does not explicitly teach that the both microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance, are oriented substantially perpendicularly to the speaker's vocalizing direction and are spaced apart from one another in the vocalizing direction by approximately 7.5 cm with a first microphone being position closer to the speaker than a second microphone.

Andrea teaches that a microphone system, wherein both microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance (fig. 3), microphone 12,14) and the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction; the microphones of Andrea (fig.3b (12,14)) are mounted on the telephone handset. As the telephone handset (see figs 1. 3b (12,14)) is rotated upwards and downwards by hand, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the speaker (represented by direction to front of speaker. Obviously, substantially perpendicularly to the speaker's vocalizing direction would have been formed during such rotations (see fig.3b (from microphones 12,14) and col.13 line 15-col.14 line 67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide the supporting member traverses an angular range, within which the main reception direction of the microphones intersects the handset.

Miura teaches both microphones space apart from one another in the vocalizing direction by approximately 7.5 cm with a first microphone being positioned closer to the speaker than a second microphone (see figs. 1-2 and constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Miura to improve low frequency respond.

Consider claim 26, Sasaki teaches a microphone system that executes an adaptive signal processing by using output signals from two microphones (see fig.2 (11,21)) and outputs a speaker's voice signal with an improved SN ratio (see col.1 line 59-col.2 line 3), the system comprising two microphones (11,21); a first microphone is oriented to an acute angle relative to a direction perpendicular to the speaker's vocalizing direction, a second microphone is oriented substantially perpendicularly to the speaker's vocalizing direction(see figs.3,6-7 and col.6 lines 13-28), and the microphones are spaced apart from one another in the vocalizing direction by about 2 cm with the first microphone being positioned to the speaker than a second microphone (see fig.8, d and col.6 line 48-col.7 line 49 and claim1 (first microphone and second microphone are adjacent to each other)); and wherein a signal from the first microphone (see fig.2, (11))) is supplied through a target response setter having a delay characteristic (14) to a subtracter (15); a signal from the second microphone (21) is supplied through an adaptive filter (24) to the subtracter (15); and the output of the subtracter (15) produces a difference signal that is supplied to the adaptive filter (24) which executes adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of the difference signal (see col.3 line 9-col. 4 line 31); but Sasaki does not clearly teach both microphones are directional microphone and Sasaki indicates only one of these two microphone a directional

microphone (see col. 3 lines 10-15), Therefore, it would have been obvious that microphone apparatus system as taught by Sasaki could have replaced the omnidirectional microphone by a directional microphone with orientation of first and second microphone and the distance between the first and second microphone in the noise cancellation system so that the desired amount of background noise can be cancelled for the market demand.

Sasaki shows that the sound signals come from a camcorder instead of from a person (see col. 1, lines 8-16 and sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37). It would have been obvious that sound signals could have come from a person, because Sasaki does not limit sound signal that it comes from a camcorder only. Therefore, it would have been obvious to place the microphones in front of and above the position of the speaker's mouth by approximately the same distance as claimed based on designer preference on how to make the noise cancellation system more efficient.

Sasaki does not teach both microphones are positioned above and to one side of the position of a speaker's mouth by approximately the same distance.

However, Andrea teaches that the microphones are oriented substantially perpendicularly to the speaker's vocalizing direction(see fig.3b); the microphones of Andrea (fig.9c (302,300 both microphones)) are mounted on the headset. As the headset (see fig.9c 302) is rotated upwards and downwards on the hinge, the axes of the microphones move in the opposite direction over a wide range of angles with respect to the speaker (represented by direction to front of speaker. Obviously, substantially perpendicularly to the speaker's both microphones are positioned above

and to one side of the position of a speaker's mouth by approximately the same distance (see fig.9c (from microphones 302 to 450) and col.19 line 65-col.20 line 41) and the microphones are spaced apart from one another in the vocalizing direction by about 2cm (see col. 19 lines 29-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Andrea to provide an active noise cancellation apparatus and active noise reduction apparatus which reduce background noise to an acceptable level.

On the other hand, Miura teaches two directional microphone (see fig.2 and abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Miura to improve low frequency respond.

7. Claims 9 and 23, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) and Miura (JP 6102829) as applied to claim 8, 26 above, and further in view of Miwa (JP 08-040070).

Consider claim 9, Sasaki and Andrea fail to disclose a microphone is mounted on the sun visor of a vehicle.

However, Miwa teaches a microphone is mounted on the sun visor of a vehicle (see constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea, Miura with

Miwa to provide the microphone arranged close to the narrow side of the sun visor facing away from the speaker/listener at only a very small distance from the sun visor.

Consider claim 23, note discussion of claim 9.

Consider claim 27, note discussion of claim 9.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi (US PAT. 5,754,665) in view of Romesburg (US PAT. 5,796,819).

Consider claim 13, Hosoi teaches that a microphone system (see fig.3) that executes an adaptive (13,14) signal processing by using output signals from two microphones (2,3) and outputs a speaker's voice signal with an improved SN ratio, wherein the microphones (2,3) have directional characteristics (because, omnidirectional microphone, non-directional microphone and directional microphone have directional characteristics) and are positioned close to one another, and the SN ratio of the output signal from one microphone (first microphone) is raised inherent,(because one microphone is closer and other microphone is farther from a speaker) while the SN ratio of the output signal from the other microphone (second microphone) is lowered (see col.1 line 60-col. 2 line 5); wherein a first adaptive (see fig.3, 13) signal processor receives an output signal from one microphone (2) and an error signal (104) and provides an output signal to a subtracter (15 (adder, but the negative sign from adaptive filter (13), therefore the adder 15 becomes subtracter), a second adaptive (14) signal processor receives an output signal from the other microphone (3) and said error signal (105) and provides an output signal to said subtracter (16 (adder, but the negative sign from adaptive filter (14), therefore the adder 16 becomes subtracter), and the subtracter (15,16 (adder) but the negative sign from adaptive filters (13,14), therefore the adders 15 16 becomes subtracter) outputs said error signal (104,105) as

a difference said output signals (103), the first and second adaptive signal processors (13,14) executing adaptive signal processing to minimize the power of said error signal (104,105) and see col.2 line 46-col.3 line 20); but Hosoi does not clearly teach that the first and second adaptive signal processors executing adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of said error signal.

However, Romesburg teaches that the first and second adaptive (28,30) signal processors executing adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of said error signal (see fig.2 and col. 5 line 22-col.6 line 33).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg into Hosoi for the purpose acquiring the desired audio sound quality for the market demand.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi (US PAT.5,754,665) as modified by Romesburg (US PAT. 5,796,819) as applied to claim 13 above, and further in view of Walters (US PAT.5,442,813).

Consider claim 14, Romesburg teaches a microphone (see fig.2,22) is disposed almost directly above the face of a speaker (4), but Romesburg does not clearly teach both microphone are positioned at about the same height above a speaker's mouth.

However, Walter teaches both microphone (see fig.2, 2-4) are positioned at about the same height above a speaker's mouth (see figs 2-4 and col.4 line 24-51).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching Walters into the Romesburg with Hosoi to for the purpose acquiring the desired audio sound quality for the market demand.

10. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoi (US PAT.5,754,665) as modified by Romesburg (US PAT. 5,796,819) and Walters (US PAT. 5,442,813) as applied to claims 13-14 above, and further in view of Lange (EP 457,176) and Miura (JP 61028294).

Consider claims 15-16, Hosoi and Romesburg, Waltes fail to teach a microphone system of the other microphone is spaced apart on the occipital side from the position of the one microphone; and a microphone system of the other microphone is spaced apart on the occipital side by about 1 to 5 cm from the position of the one microphone.

However, Lange teaches a microphone system wherein the other microphone is spaced apart on the occipital side (see fig.1 (1a)) from the position of the one microphone (1a, between the driver with two 1a microphones).

On the other hand, Lange does not clearly teach between two microphones distance about 1-5cm, However, various of distance of microphone of a microphone array is well known in the art (official notice is taken). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Lange by implementing a particular microphone arrangement between tow microphone distance is 1-5cm, as claimed for purpose of acquiring the desired noise cancellation quality for market demand.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg and Hosoi, Walters with Lange to the noise canceller so that the desired amount of background noise can be cancelled for the market demand.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Lange (EP 457,176).

Consider claim 17, Sasaki teaches that a microphone system comprising two microphones (see fig3, (11,22)) positioned inherently (because a camcorder) at a height above a speaker's mouth, wherein first microphone (22) is disposed substantially directly above the face of a speaker (see col.10 line 10-60); and wherein a signal from the first microphone (see fig.2, (11))) is supplied through a target response setter having a delay characteristic (14) to a subtracter (15); a signal from the second microphone (21) is supplied through an adaptive filter (24) to the subtracter (15); and the output of the subtracter (15) produces a difference signal that is supplied to the adaptive filter (24) which executes adaptive signal processing on the basis of the LMS (Least Mean Square) algorithm so as to minimize the power of the difference signal (see col.3 line 9-col. 4 line 31).

Sasaki shows that the sound signals come from a camcorder instead of from a person (see col. 1, lines 8-16 and sound signal, col. 3, lines 1, 7, 56; col. 5, lines 27-37). It would have been obvious that sound signals could have come from a person, because Sasaki does not limit sound signal that it comes from a camcorder only. Therefore, it would have been obvious to place the microphones in front of and above the position of the speaker's mouth by approximately the same distance as claimed based on designer preference on how to make the noise cancellation system more efficient.

Sasaki does not explicitly teach that first microphone is disposed substantially directly above the face of a speaker and the second microphone is spaced

apart on the occipital side by about 1 to 5 cm from the position of the first microphone in a vehicle.

However, Lange teaches that first microphone (see fig.1, 1a) is disposed substantially directly above the face of a speaker (driver), wherein the second microphone is spaced apart on the occipital side (see fig.1 (1a) from the back of the driver) by from the position of the one microphone (1a from front of the driver).

On the other hand, Lange does not clearly teach between two microphones distance about 1-5cm, However, various of distance of microphone of a microphone array is well known in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Lange by implementing a particular microphone arrangement between tow microphone distance is 1-5cm, as claimed for purpose of acquiring the desired noise cancellation quality for market demand.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki with Lange to provide the microphone apparatus for the purpose acquiring the desired audio sound quality in the vehicle for the market demand.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) modified by Lange (EP 457,176) as applied to claim 17 above, and further in view of Yoshida (US PAT. 5,473,702).

Consider claim 20, Sasaki and Lange fail to teach that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients

during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter.

However, Yoshida teaches that a microphone system determines filter coefficients of the adaptive filter by an adaptive signal processing during a period of non-recognition of a voice, does not update the filter coefficients (such as control signal ck) during a period of recognition of a voice, and sets the filter coefficients determined during the non-recognition of a voice to the adaptive filter (col.8 line 30-col.9 line 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Yoshida into the teaching of Sasaki and Lange to provide a noise canceller to adapt automatically to changes in background noise level.

13. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) as modified by Andrea (US PAT. 6,061,456) and Miura (JP6102829) as applied to claim 22 above, and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 24-25, Sasaki and Andrea, Miura fail to teach a microphone system, wherein the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system, wherein the microhones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Sasaki and Andrea, Miura into the teaching of Romesburg to provide the microphone apparatus for the purpose acquiring the desired audio sound quality for the market demand.

14. Claims 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US PAT. 5,471,538) in view of Andrea (US PAT. 6,061,456) and Miura (JP61028294) as applied to claim 26 and further in view of Romesburg (US PAT. 5,796,819).

Consider claims 28-29, Sasaki and Andrea fail to teach a microphone system wherein the microphones are mounted on the ceiling above the driver's seat of a vehicle; and the microphones are mounted on the ceiling above the front passenger seat of a vehicle.

However, Romesburg teaches a microphone system wherein the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the driver's seat of a vehicle; and the microphones (see fig.8 (22,36)) are mounted on near the ceiling above the front passenger seat of a vehicle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Romesburg in to the teaching of Sasaki and Andrea, Miura to provide the microphone apparatus for the purpose acquiring the desired audio sound quality for the market demand.

Response to Arguments

15. Applicant's arguments filed 02-13-2006 have been fully considered but they are not persuasive.

Regarding claim 1, applicant argued in substance that (1) Andrea does not teach the approximately 0^{o} and 45^{o} (remarks, page 9), (2) Andrea does not teach the microphones are above the speaker's mouth by about the same distance (remarks, page 9), (3) the motivation to combine.

The examiner respectfully disagrees. First of all, applicant's claim language does not require definite numerical values, in stead, only approximate to these values. For example, claim 1 requires approximately 0^{o}, approximately 45^{o} approximately the same distance. This holds true for all the pending claims. It is not clear what degree the approximation is required, be it $\pm 10^{o}$, $\pm 20^{o}$, $\pm$5cm or $\pm$10cm, or some other values/ranges ? The prior art elements relied on clearly meet the degree of approximation as broadly and fairly interpreted.

As to (1), in Andrea, the two microphones (12, 14) are located in a standard/handset telephone receivers. It is commonly known that a user/speaker holds and speaks to the receiver in a number of ways, including speaking to the sensitive surface 44 at various angles and distances such as perpendicular to the surface. Therefore, Andrea teaches the angle formed by the orientation of one microphone (12, fig.3b) with respect to a speaker's vocalizing/talking direction (user is facing and talking to the telephone's receiver's surface 44) is approximately 0^{o} (coincide with the axis of

microphone 12) sometimes, and the orientation of another microphone (14) to form an angle of approximately 45° some other times (45° clearly lies in the range between 30° and 60°, col.14 lines 7-12) with respect to the speaker's vocalizing/talking direction.

As to (2), Andrea teaches the two microphones are positioned in front of and above the position of a speaker's mouth by approximately the same distance in the configuration shown in fig. 9c, wherein the receiver is in the form of a headset and a user speaks to the microphones (fig.9c and col.19 line 65-col.20 line 41). Microphone positions in such configurations are typically flexible/adjustable to a number of combinations of locations, including a position in front of and above a speaker's mouth by approximately the same distance which allows the speaker's drinking of water, for instance.

As to (3), in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, a motivation to combine was provided in the previous office action. In addition, both Sasaki and Andrea references are directed to the same field of audio signal processing.

Applicant's further arguments, such as those on page 11, 3rd paragraph, page 12, 3rd paragraph and page 14, 2nd paragraph were all centered on the degree of approximation. Note discussion above.

Applicant's further arguments, such as those on page 13, 3rd paragraph, Hosoi and Romesburg fail to teach the same error signal and same subtracter.

The examiner response is that the argued " the same error signal and same substracter" is not claimed, and thus moot.

For these reasons, applicant's arguments are not persuasive.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date

of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

18. Any response to this action should be mailed to:

Mail Stop ____(explanation, e.g., Amendment or After-final, etc.)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Facsimile responses should be faxed to:
(703) 872-9306

Hand-delivered responses should be brought to:
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (571) 272-7501 The examiner can normally be reached on Monday-Friday from 8:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian, can be reached on (571) 272-7848.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (571) 272-2600.

Lao, Lun-See L.S.
Patent Examiner
US Patent and Trademark Office
Knox
571-272-7501

Date 4-28-2006

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

5/1/06